

ATOMIC ENERGY

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Dear Sir:

Engineering design, detailed specifications, and cost estimates for the materials testing reactor to be constructed at the new \$500 million projected Arco, Idaho, field facility, will be done by Blaw-Knox Construction Co., of Pittsburgh, Pa. The contract, for architect-engineer services, at this first unit at Arco, where work on the entire national nuclear reactor development program will be carried out, was awarded to Blaw-Knox's Chemical Plants Division. This firm has already been active in the field of plutonium manufacture. Primary purpose of the new reactor will be to test various reactor construction materials under intense neutron bombardment. The intensity will be greater than any experienced before, exceeding even the large production reactors at the Hanford plutonium works.

A three nation conference on nuclear reactor safeguards and related subjects, held in England last week, saw a committee of five Americans, headed by Dr. Edward Teller, of the University of Chicago, meeting with British and Canadian representatives. A part of the three-nation technical cooperation program set up in January, 1948, discussions centered about biological tolerances to radiation of plants, animals, and human beings; environmental and meteorological studies of the treatment of radioactive wastes, and reactor hazards caused by control or structure malfunction, accidental error of operations, or sabotage.

"Evaluation of Radiation Hazards": a round table discussion--and an address by Dr. Karl T. Compton, eminent physicist, and presently chairman of the Armed Forces Research and Development Board, will feature the Second Annual Nucleonics Symposium. This symposium, sponsored by the Institute of Radio Engineers, and the American Institute of Electrical Engineers, will be held at the Hotel Commodore in New York City from October 31st through November 2nd, 1949.

The International Conference on Experimental Nuclear Physics reached its closing sessions in Basel, Switzerland, last week, where 200 physicists from most of the countries of the world had met in this first post-war conference of its kind. Of the ten principal papers presented, five were by American physicists, four by British, and one by a physicist from Holland. Drs. E.M. McMillan and E. Segre, of the University of California, Dr. I.I. Rabi, of Columbia University, and Dr. Julian Schwinger, of Harvard, presented the American papers. A second section of the conference, to be held at Como, Italy, will be a week-long Conference on Cosmic Rays; Enrico Fermi, Italian physicist, is scheduled to disclose his new theory on cosmic rays at this conference.

Only laboratory under direct operation of the U. S. Atomic Energy Commission, the quality control laboratory at New Brunswick, N.J., now has forty scientists engaged in radioactive raw material analytical determinations. Uranium, thorium, and beryllium ores are of primary concern, with the uranium minerals coming from Colorado, Canada, and the Belgian Congo. One process in use here is a new British idea to use amyl acetate, instead of ether, for extraction during analysis for iron impurities.

AT THE ATOMIC CITIES OF THE UNITED STATES...

OAK RIDGE, Tenn.- New uranium-235 production plant, to be constructed here to further increase output of U-235 and reduce its cost, has been given the go-ahead signal. A needed \$59,849,000.00 had been authorized by Congress; recent signing by the President of this appropriations bill was the starting whistle. Total cost of the plant, to be known as K-29, is estimated at \$66,649,000.00; previous fiscal year budget had allocated \$6,800,000.00. Maxon Construction Co., of Dayton, Ohio, under their AEC contract, is the prime contractor. Plans and specifications for the process plant are work of Giffels and Vallet, Inc., Detroit; Sargent and Lundy, Chicago, are designing alterations in the electrical system in the K-25 area (present gaseous diffusion U-235 producer; K-29 will be close-by); Carbide and Carbon Chemicals, New York, now operating K-25, are handling process design and procuring special or critical equipment and materials. Kaighin and Hughes, Toledo, are mechanical sub-contractors, and Edenfield Electrical Co., Nashville, are electrical sub-contractors, under Maxon. This K-29 plant, which will facilitate the stripping of U-235 from the gaseous feed, is expected to be completed by 1951. The several thousand construction jobs it will provide will be welcomed in the local Oak Ridge-Knoxville area, which has been hard hit by unemployment.

Approximately 106,000 pounds of silver, which had been used in the electromagnetic plant (Y-12) here during World War II, have now been returned to the U. S. Treasury. The present shipment is a small part of the total silver borrowed from the Treasury, and used in Y-12 during the crucial war years when copper was scarce. The silver was used to fabricate bus-bars, substituting for copper; it helped bring Y-12 into early production of uranium-235. Now, with more efficient processes for making U-235, most of Y-12 is in a standby capacity. Disposition of the silver remaining in the plant depends upon decisions as to Y-12's future operation.

RICHLAND, Wash.- Construction of two \$80,000,000.00 plants at Hanford is scheduled for next Spring; the facilities, of a type never before attempted, will be in addition to the Hanford plant which began this past June 27th using production line techniques for final reclaiming, refining, and fabrication of plutonium metal (AEN 6/21/49). They will also supplement the unit, now under construction here, which is expected to be completed this November. Now, about 3,000 construction workers are engaged at Hanford; by December, 1949, the force will be cut to about 1,000.

Wage boosts have recently raised General Electric Company's Hanford payroll about \$415,000.00 a year, the company (contract operator of both Hanford Plutonium Works and supporting town) recently estimated. Increases were in "isolation" and shift differential pay for workers paid weekly. Some of the raises are the result of the contract signed May 31st between G-E and the Hanford Atomic Metal Trades Council (AFL).

LOS ALAMOS, New Mexico- Haddock Engineers, Ltd., and Associates, of Santa Fe, on a bid of \$1,559,600.00, have been awarded bid inv. 291-49-173 under which they will put up 26 reinforced concrete buildings here, with roads, etc. At Sandia Base, atomic weapons engineering center near Albuquerque, N.M., the U. S. Engineers at Albuquerque have asked bids under invitation 005-13 for construction of roads for residences, with bid closing date not yet announced.

Reorganization of Los Alamos Hospital into a non-profit Los Alamos Medical Center, Inc., has begun here. Medical Center operations will be under direct contract with the AEC, eliminating the ZIA Company, now operating the hospital as a part of its overall Los Alamos management work. Under the new set-up, the board of trustees will be AEC appointees. (Shortly, a new \$2 million hospital plant will replace the present temporary-type structure--AEN 8/30/49.)

NUCLEAR INSTRUMENTS...and activities in the instrument field...

At the Fourth National Instrument Conference and Exhibit, being held in St. Louis, Mo., Sept. 12th through 16th, papers to be presented in the field of nuclear work include "The Cyclotron as an Instrument", by W. W. Salisbury, of Collins Radio Co., Cedar Rapids, Ia., "The Photographic Plate as an Instrument in Nuclear Research, Autoradiography, and Radiation Monitoring", by J. H. Webb, of Eastman Kodak Co., Rochester, N.Y.; "Cosmic Ray Instrumentation", by R. D. Sard, of Washington University, St. Louis.

Nuclear instrument manufacturers exhibiting their products at this conference include Consolidated Engineering Corp., Pasadena, Calif.; Kelley-Koett Man. Co., Covington Ky.; National Technical Laboratories, So. Pasadena, Calif.; Streeter-Amet Co., Chicago, Ill., and Tracerlab, Inc., Boston, Mass.

Among recently released products of nuclear instrument manufacturers were:

New "100" scaler. Direct reading, without interpolation or multiplication, through a built-in Wizard register and direct reading neon lights. Timing errors are eliminated by provision for starting and stopping both scaler and an electric timer with a single start-stop switch.--Tracerlab, Inc., Boston 10.

Beta-Gamma Scaler, model K-280. Combines in one unit such features as scales of 64, 128, and 256; scale selector; autotime; autocount, and high-voltage supply.--Kelley-Koett Man. Co., Covington, Ky.

New "enriched" BF₃ neutron counters. Of brass, in various sizes. Also, new type "A" mica end window radioactivity counters made of stainless steel with fused glass mica-to-steel seals. Life claimed in excess of one billion counts.--N. Wood Counter Laboratory, Chicago, Ill.

ATOMIC PATENT DIGEST...latest applications and grants...

Sources of radiation. Patent application No. 20106, made to British Patent Office, Aug. 2nd, 1949, by Philips Electrical, Ltd. (In Holland, Aug. 5th, 1948.)

Subjecting charged atomic particles to magnetic fields. Patent application No. 20171, made Aug. 3rd, 1949, to British Patent Office, by S. H. Lucas.

Ionization chamber, for measuring the radioactivity of a gas within the chamber. U. S. Pat. No. 2,479,600, issued Aug. 23rd, 1949, to Casimer J. Borkowski, Oak Ridge, Tenn., and assigned to the U. S. Government (USAEC).

Method and apparatus for radioactivity well logging. A method of logging a bore hole using a pair of radiation detectors of different lengths, one of the detectors being as long as the thinnest stratum to be logged. U.S. Pat. No. 2,481,014, issued Sept. 6th, 1949, to Gerhard Herzog, Houston, Tex., and assigned by mesne assignments to the Texas Company, New York, N.Y.

Uranium salt recovery. Uranium is separated from metal contaminants by adding 1 mol. of di-sodium ethylenediamine tetraacetate per mol. of metal salts in aq. solution of pH 2.5-4.0. Uranyl ethylenediamine tetraacetate is formed as a yellow ppt., sol. in acid and basic solns., the other metals remaining in soln. Depending on the contaminating metals, 90-100% of the uranium is thus recovered. Swiss Pat. No. 249,369, issued April 16th, 1948, to Chemische Fabrik Uetikon.

PARTICLE ACCELERATORS...in medical work...

First use has recently been made on a human patient of the 22 M.e.v. betatron of the University of Illinois' College of Medicine, in Chicago. (Research studies had been conducted since its installation some 6-months ago.) Initial treatment was a 100 r. dosage over a 3 minute 20 second period. The patient, a 72 year old white male, has cancer of the larynx in an advanced stage. To support continuing research studies on this betatron, the United States Public Health Service recently granted this College \$15,000.00 specifically for the study of the effects of the betatron X-ray beam on bone and cartilage. Work will be under the supervision of Dr. Roger A. Harvey, of the Department of Radiology, and Dr. Granville A. Bennett, of the Department of Pathology.

RADIATION NOTES...

Studies have been undertaken at the University of Rochester, New York, on the prevention of radiation sickness with rutin and with flavanoids. Of 22 dogs irradiated with 350 r., 60% died; administering 200 mg. of lemon peel extract orally one week prior to irradiation, and 28 days after irradiation, reduced the mortality to 36%. When rutin was given before and after irradiation, 11% of the animals died; when it was given only before or only after irradiation, 80 and 60% respectively, died. Pressure induced petechiae and spontaneous purpura were less frequent in irradiated dogs given rutin than in dogs treated with lemon peel extract. However, blood platelets were depressed, and moderate hypocoagulability was present in both the control and rutin-treated dogs. The tendency toward anemia was delayed, and high sedimentation rates were prevented in rutin-treated dogs, but the erythroblasts and nucleated red blood cells were increased.

Research has been conducted at Argonne National Laboratory, Chicago, in which the chemical cysteine, given orally or intravenously to rats and mice in a single dose an hour before exposure, has enabled them to survive an X-ray dosage as high as 1,500 r. (Cysteine is an inexpensive, sulphur-containing amino acid.) Cysteine is effective only when given before exposure to radiation; it is not effective when administered after exposure. The laboratory said this suggests that radiation damage occurs at the very instant of exposure, and not subsequently. The presence of cysteine in the animal during radiation prevents, in some as yet incompletely understood manner, the inactivation or destruction of certain cellular constituents by the X-rays. Studies here are now progressing into the field of clinical observation of the effect of cysteine on cancer in higher animals; the possibility is seen that, if the chemical can make human tissue radiation-resistant without altering the sensibility of malignant growths, it may be possible to increase radiation dosage now being used for tumor treatments in humans.

An experimental beta ray applicator using such fission products as ruthenium-106, and cerium-144, has been devised at the Department of Radiotherapeutics, of the University of Cambridge (England), in an attempt to overcome the low penetrating power of such applicators loaded with radium and radon. Since it was desired to produce a homogenous irradiation throughout the tumors (in the treatment of which the applicator was to be used) and then a rapid fall-off in the underlying tissue, a device was constructed to collimate the emitted particles and scatter them with the help of thin foils. A collimator about 8 cm. long was used, with cerium-144 on blotting paper at one end of the tube. The beam passes through 2 gold foils of 25 mg./cm² each, and an aluminum foil of 50 mg./cm². The gold foils tend to scatter the weaker beta particles out of the beam, with little effect on the stronger ones. The aluminum foil performs the same function and also absorbs the weak secondary electrons produced in the last gold foil. It has been possible to obtain reasonably uniform fields, over a depth of 3-4 mm., using beta rays from fission products, with this device.

RADIOISOTOPES...applications to problems...

An application of radioactivity to an engineering problem were recent bearing wear and lubrication tests made on a power driven duplex oil pump at the works of Messrs. Hayward-Tyler & Co., Ltd., Luton (England). This pump had one of its big end bearings fitted with a cast-iron bushing, made radioactive in the larger atomic pile (BEPO) at Harwell Atomic Energy Research Establishment. As a result, any particles worn off the bushing during running made the lubricating oil radioactive. The oil was collected, and placed in light-tight containers with strips of X-ray photographic film, and kept in motion in a rotating drum for several weeks. Radiation from any particles of the bushing contained in the oil caused fogging of the film, with the density of this fogging proportional to the amount of radioactive material in the oil. These results enabled calculations to be made of the bearing wear over a given period to an amount as small as one micro-inch.

RADIOACTIVE ORE DISCOVERIES...new workings...worldwide...

UNITED STATES...Moab, Utah- Uranium Mines, Inc., of Los Angeles, Roy James, president, have completed the purchase of a group of uranium claims in the Seven Mile section, some 10 miles west of Moab; consideration was said to be \$65,000.00. The firm of Ross & Reister, Los Angeles, will start operations immediately for Uranium Mines, Inc., with the mining and trucking of ore to the Monticello mill of the AEC.

Grand Junction, Colo. - Uranium ore mining operations of the Colorado plateau are expected to reach a new peak this fall, with approximately 300 mines in operation then. Six plants will be refining uranium and vanadium: the Monticello, Utah, mill of the AEC, recently completed and operated under contract by the Galigher Company of Salt Lake City; plants at Naturita, Durango, and Hite, Utah, owned or operated by the Vanadium Corp of America; and the plants at Uravan and Rifle operated by the United States Vanadium Corp.

CANADA- In Saskatchewan, numerous occurrences of pitchblende are being worked, some near the Canadian government's Eldorado Mining and Refining Company's operations at Beaverlodge Lake. At Nicholson Mines, on the shore of Lake Athabaska, 2 miles east of Goldfields, payable quantities of pitchblende have been found. At Nisto Mines, in the Black Lake Area, 130 miles east of Goldfields, wide zones of payable material have been established. Twenty-five miles north-east of Black Lake, at Charlebois Lake, prospectors for Arctic Yellowknife and Consolidated Smelters have found radioactive minerals tentatively identified as uraninite. East of Eldorado's Ace Group, Athona Mines have uncovered showings on their property there that have returned assays of 3.45% uranium oxide from a chip panel sample taken over an area of two feet across the vein; grab samples from this trench assayed up to 6.7% uranium oxide.

INDIA- All stocks of beryllium minerals held by mine owners or dealers are to be bought by the Indian Government. Under the Atomic Energy Act (1948) beryllium is a "prescribed substance", and as such is under the same control here as uranium, thorium, plutonium and neptunium.

Exploitation of the thorium and rare earths in the monazite sands of Travancore (AEN 7/5/49) will be a joint venture of the Governments of India and Travancore, which will entail the setting up of a corporation with a fixed capital of Rs. 5,000,000 (approx. \$1.65 million) and with Rs. 1,000,000 (approx. \$330,000.00) as working capital. The Government of Travancore has purchased the Travancore Minerals Co., from the present proprietors, and are also negotiating for the purchase of Associated Minerals Co. Mr. N. Kunjuraman, Minister of Labor, of Travancore, said this was part of the program of semi-nationalization of the essential industries of the State.

AUSTRALIA- A deposit of uranium ore has been reportedly discovered 86 miles from Marble Bar. W. D. Millar, of Bilcoela, Queensland, who made the claim, has applied to the Mines Department at Perth for permission to prospect for radioactive ores near Wodonga, where large deposits of tantalite have been worked.

SPAIN- It is reported that uranium prospecting is being carried out in Western Catalonia, and that drilling at Santa Matilde has disclosed the presence of uranium minerals.

Sincerely,

The Staff,
ATOMIC ENERGY NEWSLETTER

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